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13. ABSTRACT *(Maximum 200 words)*

Use of Modeling and Simulation (M&S) test facilities is becoming more commonplace. These facilities rely on tools, such as distributed simulation both internally to the facility and externally to link with other facilities, to increase their ability to provide a better environment to the system under test (SUT), provide the warfighter with a better end product, and the taxpayer with more testing for their dollar. Such is certainly the case with the Air Combat Test and Evaluation Facility (ACETEF) at NAWCAD Patuxent River, Maryland. Use of distributed simulation is native to ACETEF, as a tool to be employed in the test process. However, distributed simulation to JADS was not a tool to be used in a test, it was the SUT. All in all, the JADS experience for ACETEF was a positive one, and through the test needs and timeline, allowed ACETEF to broaden and, at the same time, refine its distributed simulation practices. To ACETEF personnel, it reiterated the aspect of distributed simulation that is often forgotten in today's rapid pace of distributed simulation development: distributed simulation is not something that can be learned entirely from a book. The most effective way to gain this knowledge and maintain a usable level of expertise is to participate in not only the development of the technology, but in the use of it as well. These tests provided valuable experience in all M&S areas for ACETEF, and helped ACETEF maintain its role as a recognized leader in the use of M&S for T&E.

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ACETEF in JADS-EW Tests – Generating Products and Learning Lessons

Use of Modeling and Simulation (M&S) test facilities is becoming more common place. These facilities rely on tools, such as distributed simulation both internally to the facility, and externally to link with other facilities, to increase their ability to provide a better environment to the system under test, to provide the warfighter with a better end product, and the taxpayer with more testing for their dollar. Such is certainly the case with the Air Combat Test and Evaluation Facility (ACETEF), at the Naval Air Warfare Center Aircraft Division (NAWCAD), Patuxent River, MD. Use of distributed simulation is native to ACETEF, as a tool to be employed in the test process. However, as you probably know by now, distributed simulation to JADS was not a tool to be used in a test, it was the System Under Test (SUT).

In fact, JADS EW chose to evaluate the High Level Architecture, and in particular the 1.3 implementation of the architecture as the SUT. During the work with the Engineering Protofederation, ACETEF built an interface to the 0.x version of the (what came to be known as) the RTI Interface Specification. For ACETEF's participation in the JADS-EW tests, this required, at the very least, an update to the HLA interface. In actuality, given the emphasis on performance for the closed loop simulation scenario designed for JADS EW, the choice of the 1.3 implementation of HLA, and the advances in HLA interface flexibility, ACETEF decided to redesign the HLA interface.

Redesign of the ACETEF HLA Interface centered around 2 key concepts – performance, and reusability. Since the HLA is a DoD mandate, and more of our business base is migrating towards externally distributed test events, flexibility, and ease of modifications to support a new FOMs was the critical parameter in selecting the new design. However, since real-time test and evaluation is what ACETEF is all about, that flexibility could not come at the sacrifice of performance of the interface.

Details about the design of the interface will be presented in the 1999 Fall Simulation Interoperability Workshop paper 99F-SIW-063, "The ACETEF HLA Interface for JADS-EW". From a top-level view, the interface had two components, separated by a shared memory buffer. On one side, the interface component communicated between the shared memory buffer and the RTI, and on the other side, the remaining component communicated between the ACETEF internal architecture and the shared memory buffer. This isolation allows for modification to either the RTI and/or the ACETEF architecture, without affecting the connection of the other. Additionally, ACETEF further abstracted the functions that each of these performs, to accommodate the variety of M&S attributes and interactions that we can be linked with in future exercises, even though they may not have been used in the JADS EW test.

Another aspect to the use of distributed simulation as the SUT was the participation of ACETEF personnel in the entire test process, from requirements confirmation, through review of analysis. JADS EW used the concept of IPT, and ACETEF participated as a full voting member. However, this IPT participation over the span of the test program provided was difficult for ACETEF in maintaining a single POC throughout the entire

length of the test. ACETEF's test project flow is much more dynamic, and personnel strengths are often needed in ways that can't be predicted 2 years in advance. It also required ACETEF personnel to step outside of their normal roles, learn and take on new functions, and refine distributed simulation processes within ACETEF.

All in all, the JADS experience for ACETEF was a positive one, and through the test needs and timeline, allowed ACETEF to broaden, and at the same time refine, its distributed simulation practices. To ACETEF personnel, it reiterated the aspect of distributed simulation that is often forgotten in today's rapid pace of distributed simulation development: distributed simulation is not something that can be learned entirely from a book. The most effective way to gain this knowledge and maintain a usable level of expertise, is to participate in not only the development of the technology, but in the use of it as well. These tests provided valuable experience in all M&S areas for ACETEF, and helped ACETEF maintain its role as a recognized leader in the use of M&S for T&E.